UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: PROCESS AND PRODUCT ENGINEERING
Code: 57726
Type: CORE COURSE
ECTS credits: 6
Degree: 344 - CHEMICAL ENGINEERING
Academic year: 2021-22
Center: 1 - FACULTY OF SCIENCE AND CHEMICAL TECHNOLOGY
Group(s): 21
Year: 3
Duration: C2
Main language: Spanish
Second language: English
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **MANUEL ANDRES RODRIGO RODRIGO** - Group(s): **21**

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Lecturer: **MARIA LUZ SANCHEZ SILVA** - Group(s): **21**

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2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

Not established

4. Degree competences achieved in this course

Course competences

Code	Description
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
E19	Knowledge about material and energy balances, biotechnology, material transfer, separation operations, chemical reaction engineering, reactor design, and recovery and transformation of raw materials and energy resources.
E20	Capacity for analysis, design, simulation and optimization of processes and products.
E21	Capacity for the design and management of applied experimentation procedures, especially for the determination of thermodynamic and transport properties, and modeling of phenomena and systems in the field of chemical engineering, systems with fluid flow, heat transfer, mass transference, kinetics of chemical reactions and reactors.
E22	Ability to design, manage and operate simulation, control and instrumentation procedures of chemical processes.
E30	Basic knowledge of the principles of transport phenomena and the kinetic and thermodynamic aspects of chemical processes
G01	Capacity for the direction, of the activities object of the engineering projects described in the competence G1.
G02	Knowledge in basic and technological subjects, which enables them to learn new methods and theories, and give them versatility to adapt to new situations.
G03	Ability to solve problems with initiative, decision making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Chemical Engineering.
G04	Knowledge for the realization of measurements, calculations, valuations, appraisals, surveys, studies, reports, work plans and other analogous works.
G07	Ability to apply the principles and methods of quality.
G10	Knowledge, understanding and ability to apply the necessary legislation in the exercise of the profession of Industrial Technical Engineer
G12	Knowledge of Information and Communication Technologies (ICT).
G16	Capacity for critical thinking and decision making
G19	Ability to analyze and solve problems
G20	Ability to learn and work autonomously
G22	Creativity and initiative
G23	Leadership

5. Objectives or Learning Outcomes

Course learning outcomes

Description

To have skills for the conceptual design of processes.

To have skills for programming simple process simulators.
To know the structure of a simulator.
To know the theory of scale change.
To be skilled in the application of the factorial design of experiments.
To have skills in the application of optimization procedures to industrial chemical processes.
To know techniques of evolutionary operation.
To be able to integrate the basic operations of Chemical Engineering to design an industrial process

6. Units / Contents

Unit 1: Product Engineering
Unit 2: Process conceptual design.
Unit 3: Analysis of industrial processes
Unit 4: Mathematical simulation
Unit 5: Mathematical optimization.
Unit 6: Scale up of industrial process
Unit 7: Physical optimization. Factorial design and EVOP techniques

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB02 CB03 CB04 E19 E20 E21 E22 E30 G01 G02 G03 G04 G07 G22	1.4	35	N	-	
Problem solving and/or case studies [ON-SITE]	Workshops and Seminars	CB02 CB03 CB04 E19 E20 E21 E22 E30 G01 G02 G03 G04 G07 G12 G19 G20 G22 G23	0.8	20	Y	N	
Group tutoring sessions [ON-SITE]	Cooperative / Collaborative Learning	CB02 CB03 CB04 E19 E20 E21 E22 G01 G02 G03 G04 G07 G19 G23	0.1	2.5	N	-	
Other off-site activity [OFF-SITE]	Other Methodologies	CB02 CB03 CB04 E19 E20 E21 E22 G01 G02 G03 G04 G07 G12 G16 G19 G20 G22 G23	3.6	90	N	-	
Final test [ON-SITE]	Assessment tests	CB02 CB03 CB04 E19 E20 E21 E22 G01 G02 G03 G04 G07 G12 G19 G20 G22 G23	0.1	2.5	Y	Y	
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Assessment of problem solving and/or case studies	20.00%	20.00%	focused on optimization (balance reconciliation)
Test	40.00%	40.00%	Test covering all contents of the courser
Assessment of problem solving and/or case studies	20.00%	20.00%	Focused on conceptual desing
Assessment of problem solving and/or case studies	20.00%	20.00%	Focused on the development of a process simulator
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates

Not related to the syllabus/contents

Hours	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	35
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	20
Group tutoring sessions [PRESENCIAL][Cooperative / Collaborative Learning]	2.5
Other off-site activity [AUTÓNOMA][Other Methodologies]	90
Final test [PRESENCIAL][Assessment tests]	2.5

Global activity

Activities	hours
Problem solving and/or case studies [PRESENCIAL][Workshops and Seminars]	20
Class Attendance (theory) [PRESENCIAL][Lectures]	35

Group tutoring sessions [PRESENCIAL][Cooperative / Collaborative Learning]	2.5
Other off-site activity [AUTÓNOMA][Other Methodologies]	90
Final test [PRESENCIAL][Assessment tests]	2.5
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Biegler, L. T.	Systematic methods of chemical process design	Prentice Hall		0-13-492422-3	1997	
Douglas, James M.	Conceptual design of chemical procesesses	McGraw-Hill		0-07-017762-7	1988	
HIMMELBLAU, David M.	Análisis y simulación de procesos	Reverté		84-291-7235-1	1976	
M.A. Rodrigo	Tecnicas de optimización para Ingenieros Químicos	Puntoicoma soluciones graficas		978-84-615-4081-5	2011	
Rudd, Dale F.	Estrategia en ingenieria de procesos	Alhambra		84-205-0307-X	1976	
Seider, Warren D.	Process design principles : synthesis, analysis and evaluati	John Wiley and Sons		0-471-24321-4	1998	
Valiente Bardenas, M.C.	Manual Del Ingeniero Quimico			9789681844875	2009	
Vian Ortuño, Angel	El pronostico economico en química industrial /	Alhambra,		84-205-0185-9	1975	
	Estrategias de modelado, simulación y optimización de proces	Síntesis		84-9756-404-9	2006	